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DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1, 3, 4, 6 and 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weirich et al. (US 4,713,234) in view of Edlund (US 5,139,541).

Regarding claims 1, 3 and 4, Weirich discloses an apparatus comprising:

a carbonaceous material reactor vessel (see Fig. 4) having at least one wall enclosing a reaction space having a reaction zone (1 5) containing a solid carbonaceous material (coal, col. 7 lines 3-10) and having a product gas zone (2) containing reaction product gas (hydrogen, col. 7 lines 3-10) said at least one wall forming a carbonaceous material inlet (coal is delivered through conduit 17), an hydrogen-rich gas outlet (11), and a retentate gas outlet (18); and

at least one permeable hydrogen-selective membrane (3) disposed within said reaction space and having a first side in contact with said reaction product gas and an opposite second side in contact with an hydrogen-rich gas (see Fig. 4).

Weirich, as set forth above, discloses the use of a metallic foil made from palladium in high temperature reaction conditions (col. 4 lines 7-16). However, Weirich fails to disclose said at least one permeable hydrogen-selective membrane comprising a ceramic material of perovskite oxide having a formula

$$A_{1-x}A'_xB_{1-y}B'_yO_{3-z}$$

where A is selected from the group consisting of Ba, Sr, Ca and Mg, A' is selected from the group consisting of La, Pr, Nd, Gd, and Yb, B and B' are selected from the group consisting of Ce, Nd, Sm, Eu, Gd, Tm, Yb and Y, O is oxygen, x and y are numbers in a range of 0 to 1, and z is a number sufficient to neutralize a charge in said perovskite oxide.

Edlund also discloses a hydrogen-selective membrane that is utilized in hydrogen purification involving hydrogen production under elevated temperatures (greater than 500C, col. 3 lines 20-29).

Edlund teaches that palladium membranes are associated with a prohibitively high cost (col. 1 lines 13-20). Furthermore, Edlund teaches a more economically feasible membrane composition such as palladium coated $SrCe_{(1-x)}Yb_xO_z$ (col. 2 lines 20-35) that accomplishes the hydrogen separation at a lower cost.

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the palladium foil of Weirich with the membrane composition of Edlund to reduce production costs of the apparatus while still maintaining acceptable hydrogen permeability.

Regarding claims 6, 10 and 11, Weirich, as modified by Edlund, further discloses said hydrogen- selective membrane comprises a membrane material consisting of multiple materials, including palladium (see col. 6 line 1 of Weirich and col. 2 lines 14-19 of Edlund).

Regarding claims 8 and 9, Weirich further discloses said at least one permeable hydrogen-selective membrane is disposed within a membrane

module in a tubular form (see Fig. 5 where module 3 comprises the hydrogen-selective membrane).

Regarding claim 12, Weirich further discloses a solid particle impermeable, gas permeable protective sheath (fabric support, col. 6 lines 42-53).

Regarding claim 13, Weirich further discloses said gasification reactor is a fluidized bed gasification reactor (see Figs. 4 and 5 where Weirich illustrates the gasification reactor in the form of a fluidized bed reactor with a gaseous inlet, 16 located below the solid material inlet 17).

Response to Arguments

3. Applicant's arguments filed 2/11/08 have been fully considered but they are not persuasive.

On page 11, Applicant argues that the Edlund patent does not teach or suggest a ceramic material having the claimed formula $A_{1-x}A'_xB_{1-y}B'_yO_{3-z}$. The examiner respectfully disagrees with this argument.

On page 12, Applicant states:

> perovskite oxide. Applicants respectfully urge that the only perovskite oxide material taught by the Edlund patent has the formula
>
> $$SrCe_{1-x}Yb_xO_z$$
>
> where x is from 0.05 to 0.10, α is a variable determined by the oxidation state of M and M is a metal selected from Dy, In, Mg, Nd, Sm, Y, Yb, and Zn and such perovskite oxide is not a perovskite oxide in accordance with the formula claimed by Applicants. Since x is from 0.05 to 0.10, the composition of the Edlund patent always

As best understood, Applicant is arguing that the perovskite structure taught by Edlund is not the same as the perovskite structure taught by the claimed formula. However, the claim, in its current form, does not claim a specific type of perovskite structure. The claim only states a generic perovskite structure and then further claims a formula which further defines the claimed perovskite structure.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a particular type of perovskite structure) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

As such, the Edlund reference does indeed cover the claimed subject matter of a perovskite structure with a formula that is read upon by the claimed formula.

For clarification purposes, the examiner will further point out how the claimed perovskite formula was interpreted to read upon the formula of Edlund.

The claimed material A_{1-x}, corresponds to Sr in Edlund, where x equals zero, which falls in the claimed range of x (0 to 1).

The claimed material A'_x is not contained in Edlund, however by claiming a range of x of zero to 1, Applicant is indicating A' is an optional element.

The claimed material B_{1-y} is equivalent to $Ce_{(1-x)}$ of Edlund, where Edlund discloses a range for x which falls within the claimed range for y.

The claimed material B'_y is equivalent to Yb_x or Edlund, where Edlund discloses a range for x which falls within the claimed range for y.

4. Applicant's arguments with respect to the rejection of claims 1, 6 and 8-13 under 35 USC §102(b) have been considered but are moot in view of the new ground(s) of rejection necessitated by amendment.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW J. MERKLING whose telephone number is (571)272-9813. The examiner can normally be reached on M-F 8:30-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. J. M./
Examiner, Art Unit 1795

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1795